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BREECH CONSTRUCTION FOR FIREARMS

Background Of The Invention

Field: This invention relates in general to repeating firearms, and relates in particular to autoloading shotguns and other such firearms.

Prior Art: Past efforts to design improved, practical autoloading shotguns generally having been constrained by the effects of firing recoil, or by inadequately considering the effects of recoil when designing the gun. The term "autoloading" is herein used to denote a gun which, when fired, automatically ejects the spent shell and loads a fresh round from a magazine, and includes semi-automatic as well as full-automatic firing modes.

Although recoil affects any firearm to some degree, the relatively heavy recoil of shotguns is recognized by most shooters. Particularly in larger-gauge shotguns, recoil and percussion can loosen mechanical joints, i.e., riveted, screwed or bolted joints as shown in U.S. Patent 4,693,170, the disclosure of which is hereby incorporated herein by reference, in its entirety. Fatigue of adjacent metal structures also is experienced.

Where dimensionally critical portions of the gun are involved, such as the breech area including the mechanical connection of the barrel to the barrel extension for guns which have a removable barrel, such loosening of joints can compromise smooth action of the autoloading mechanism as well as creating dangerous conditions of misfirings, premature firings, shell jamming and the like.

Summary Of The Invention

An autoloading gun construction having barrel extension means constructed for rapidly receiving cartridges, missile end first, and guiding them into the breach end of a barrel, wherein said extension means is positioned between and secured to wall sections of two opposing receiver plates of a receiver section by welding.

In a much preferred embodiment, quick disconnect means are provided on the extension means and barrel for quickly removing the barrel for renewal or replacement with a barrel of a different type.

Brief Description Of The Drawings

The invention will be further understood from the drawings herein wherein certain structural portions are shown enlarged or out of proportion for clarity and where the same numbering of structures as in U.S. Patent 4,693,170 is used for equivalent structure of the present invention:

FIG. 1 is a partially longitudinally cross-sectioned side view of the present barrel extension which is similar in some respects to the barrel extension 120 of the aforesaid U.S. Patent 4,693,170;

FIG. 2 is a cross-sectional view taken along line 2-2 of Fig. 1;

FIG. 3 is a cross-sectional view along line 3-3 in Fig. 2 with structural portions broken away or removed for clarity;

FIG. 4 is a cross-sectional view taken along line 4-4 in Fig. 3 with portions broken away for clarity;

FIG. 5 is a side view as in Fig. 1 with a portion of receiver side 117R in place and welded to the edges of the locator land as indicated by the cross hatched outline, with portions of the weld broken away for clarity;

FIG. 6 is a view as in Fig. 31 of said patent with original numbering retained and additional numbering added for the present modifications; and

FIG. 7 is a view as in Fig. 4 but shown with the clip in its half-way inserted spread posture.

Detailed Description

Referring to the drawings and with particular reference to the claims herein, the present construction modifies the connection means between a barrel extension such as item 120 and a barrel such as 40 and also receiver sides such as items (plates) 117L and 117R of the aforesaid patent 4,693,170 as shown in Figs. 2, 3, 13 and 31 thereof. In said patent the connection is made between all three of these structures by four rivets 118 which are headed over (clinched) on the outside of plates 117L and 117R. In this construction shown particularly in applicants' Fig. 6 taken from Fig. 31 of said patent and wherein additional new numbering is added where necessary for clarity starting at 500, rivets 118 tightly nest in transverse grooves 500 across the top and bottom of the inner end (breech end) of barrel 40 and thereby fix the barrel to extension 120 and thus to receiver section 41. This structure, of course, prevents removal of the barrel which can cause great inconvenience where it is desired to replace a damaged barrel or to replace the barrel with another type, e.g., from shotgun to rifle.

Referring to the present drawings wherein the numbering of parts, where relevant, is the same as in said 4,693,170 patent, the barrel extension 120 is preferably formed on both sides with locator lands 502 which can be of any configuration but preferably of a shape to coincide substantially with apertures 504 formed thru each side 117L and 117R of receiver section 41. Welds such as 506 are formed between the adjacent edges of the lands, or sides of 120 where lands are not provided, and of apertures 504. In the drawing (Fig. 5) excessive clearance between these adjacent edges is shown, as well as unwelded portions, for clarity. Precision mating of these edges

within a few thousandths of an inch, e.g., less than 0.020 in. is highly desirable. The size of lands 502 should be approximately in the proportions shown to assure a joint which is unyielding under rapid fire stresses.

Should it be desired to permanently affix the barrel to the barrel extension as shown in the aforesaid patent, rivets 118 may be employed in conjunction with welds 506. However, in a highly preferred embodiment of the present invention the gun barrel is removably mounted in the forward end of the extension means by a unique and easily disassembled "slot and clip" connector means generally designated 508 and, most preferably, in combination with a barrel clamping mechanism generally designated 510 for tightly securing and stabilizing the barrel within the forward end of the barrel extension.

Clip 508 as shown in Figs. 4 and 7 comprises a pair of arms 512 and 514 integral with body portion 516 and preferably having rectangular cross-sections. These arms are dimensioned to slide easily thru slots 518 and 520 respectively formed laterally thru extension 120, and thru slots 522 and 524 respectively formed across the top and bottom of breech end 526 of the barrel. The lateral play of these arms in the slots should be just enough, e.g., from about 0.004 in. to about 0.008 in. to allow easy insertion and sliding of the arms in the slots while preventing longitudinal movement of any significant degree of the barrel relative to the barrel extension. These slots each has a vertical dimension 528 which allows the arms to spread apart as shown in Fig. 7 as cam surfaces 530 on the insertion ends of the arms slide on the bottom surface 532 of each of slots 522 and 524 in the barrel.

Clip 508 is made of metal, e.g., stainless steel which is sufficiently resilient to spring back into the locking position as in Fig. 4 as the clip is fully inserted thru the slots. As shown in Fig. 5, an opening 534 is formed

thru each plate 117L and 117R to allow insertion of the arms and to allow the inner edge 536 of body portion 516 to lie flush with the barrel extension side. It is preferred that a cut-out 538 be provided in said inner edge 536 to allow for the insertion of a tool such as a screwdriver or knife blade to assist in extracting the clip, if necessary. It is noted that the clip 508 can be inserted thru either side of the receiver section.

As shown in the drawings, the aforementioned barrel clamping mechanism comprises a slot 540 cut longitudinally thru the bottom wall portion 542 of the forward portion of the extension 120 from the front edge 544 thereof back to approximately the barrel abutment shoulder 546 on the wall 547 of the extension bore. Extending down on the sides of slot 540 are projections 548 and 550. One projection is provided with a threaded bore 552 which receives a tightening means such as a bolt or Allen screw or the like 554. The clearance between the extension bore wall 547 and the barrel breech end 526 is small such that a tightening turn or so of screw 554 will squeeze wall 547 against breech end 526 of the barrel and further secure it within the extension bore.

The invention has been described in detail with particular reference to preferred embodiments thereof, but it will be understood that variations and modifications will be effected with the spirit and scope of the invention.